

# Florian Felix Kämpf

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## EDUCATION:

- 10/2024 - Present      **PhD**, Biological Sciences  
MRC-LMB, University of Cambridge, United Kingdom  
Preliminary Thesis title: *“Contact Chemosensation and Neural Control of Internal States in Drosophila melanogaster”*
- 2021-2024              **MSc**, Biological Sciences  
University of Konstanz, Germany  
Thesis title: *“Mapping functional dynamics and neuronal structure in a hindbrain neural integrator circuit”*  
Final Grade: 1.1
- 2017 - 2021           **BSc**, Biological Sciences  
University of Konstanz, Germany  
Thesis title: *“Evaluating the effect of simulated predation on the contest behaviour of Neolamprologus brevis”*  
Final Grade: 2.2
- 2017                    **High School, Abitur**  
Final Grade: 2.5

## RESEARCH AND WORK EXPERIENCE:

- 2024-Present      **PhD, Jefferis Lab, MRC-LMB (PI: Gregory Jefferis)**  
*“Contact Chemosensation and Neural Control of Internal States in Drosophila melanogaster”*
- Developed a comprehensive research proposal to investigate the neuronal mechanisms underlying internal states induced by the contact chemosensation of sex specific pheromones.
  - Conducted a detailed analysis of the male *Drosophila* nervous system connectome to uncover neural connectivity patterns that drive opposing behaviours upon sex pheromone detection.
  - Built and designed a spherical treadmill virtual reality setup enabling the experimental dissection of *Drosophila melanogaster* courtship behaviour.
  - Built and designed a two photon microscope setup with an integrated virtual reality setup for the experimental dissection of *Drosophila melanogaster* courtship behaviour.
- “Comparison of the auditory pathways in male and female Drosophila producing sex specific behaviour”*
- Cross-identified secondary neuron types involved in processing courtship song within the connectomes of both the female and male *Drosophila*.
  - Analysed differences in the courtship-related auditory neural pathways in both female and male *Drosophila*, leading to distinct behavioural responses to male courtship song.
- 2022-2024           **M.Sc, Bahl Lab, University of Konstanz (PI: Armin Bahl, PhD Supervisor: Katja Slangewal)**  
*“Investigation of functional dynamics of a motion integrator using biased and unbiased metrics.”*
- Established multiple metrics to analyse calcium dynamics of cells participating in the motion integration circuit within the larval zebrafish hindbrain through Python analysis
  - Identified multiple novel motion processing loci and introduced a mutual information neighbourhood metric to highlight potential connectivity within the motion integration circuit.
- “Automatic neurotransmitter profile identification for functional imaging of larval zebrafish.”*
- Established HCR-RNA FISH as a method to identify glutamatergic and GABAergic neurons within the larval zebrafish brain by comparing HCR-RNA FISH stains of Gad1b and Vglut2a to endogenously DsRed marked protein distributions.
  - Established a metric-based nearest neighbour cell shape similarity method to quantize the quality of diffeomorphic cell-to-cell registration of zebrafish brains post and

- pre-HCR-RNA-FISH treatment using Python
- Optimized the protocol for diffeomorphic zebrafish larva brain registration to ensure cell-to-cell matching quality.

*“Functionally guided photoactivation to map neurite morphologies.”*

- Established a 2-photon imaging protocol combining functional identity and neurotransmitter identity of cells with their neurite morphology by leveraging an alpha-tubulin bound, photoactivatable version of GFP.
- Identified the stereotypical morphology of the functional cell class of dynamic threshold neurons enabling the revision of the current models of motion integration in the larval zebrafish hindbrain.
- Visualized the explored functionally identified morphologies in a comprehensive and interactive analysis using Python, enabling comparison between and within functional cell classes.

2021-2024

**Research assistant, Bahl Lab, University of Konstanz (PI: Armin Bahl)**

*“Neural basis of visual information integration.”*

- Conducted volumetric functional 2-photon imaging and created visual stimuli to test responses to luminance and motion.
- Analysis of large datasets to examine the visual integration of different stimuli.
- Established a dynamic clustering pipeline investigating the localization of motion and luminance integrating functional clusters within the larval zebrafish brain.
- Leveraged diffeomorphic registration to create comprehensive visualizations of the localization of functional clusters within the larval zebrafish hindbrain (metric maps).

2021

**Field assistant, Behavioural Evolution Lab, University of Konstanz (PI: Alex Jordan, Supervisor: Aneesh Bose)**

*“Field research at lake Tanganyika, Mutondwe Island, Zambia: Investigating the preferences of an abundant resource across lamprologine fishes.”*

- Scientific diving, collecting, and measuring *Neothauma* shells
- Capture of wild lamprologine fish to relate body-size and sex to associated *Neothauma* shells
- Maintenance of a comprehensive field lab book detailing collected data

2021

**Compact course, Bahl Lab, University of Konstanz (PI: Armin Bahl, PhD: Katja Slangewal)**

*“Investigation of the motion integration circuit in the larval zebrafish using photo ablations.”*

- Established a pipeline to logically identify dynamic threshold cells based on functional 2-photon microscopy in the anterior hindbrain of the larval zebrafish.
- Optimized laser exposure duration and strength to ensure single-cell ablation of identified dynamic threshold cells.
- Engineered an analysis pipeline on Python to detect calcium dynamic changes of non-target motion integrator cells post-ablation.

2020-2021

**B.Sc, Behavioural Evolution Lab, University of Konstanz (PI: Alex Jordan, PhD: Etienne Lein)**

*“Evaluating the effect of simulated predation on the contest behaviour of *Neolamprologus brevis*.”*

- Constructed an arena allowing pairwise interaction between conspecifics while subjected to olfactory simulated predation.
- Behavioural scoring of videos and Computational statistical analysis of observed behaviours.
- Visualization of the change in interactive behaviours during simulated predation.

2018-2019

**Student internship, Behavioural Evolution Lab, University of Konstanz (PI: Alex Jordan, PhD: Etienne Lein)**

*“Observational behaviour in social cichlids: Assessing Interest in Conspecific Social Interactions.”*

- Constructed an arena allowing target fish to observe pairwise interactions of conspecifics.
- Elastomer tagging of experimental animals to ensure identity.

- Conduction of experimental procedure including transfer of experimental animals and video recording

## PUBLICATIONS

- 2025 Berg S, Beckett IR, Costa M, Schlegel P, Januszewski M, Marin EC, Nern A, Preibisch S, Qiu W, Takemura S, Fragniere AMC, Champion AS, Adjavon D, Cook M, Gkantia M, Hayworth KJ, Huang GB, **Kämpf F**, Katz WT, Lu Z, ... Jefferis GSXE "Sexual dimorphism in the complete connectome of the *Drosophila* male central nervous system." *bioRxiv*. doi: 10.1101/2025.10.09.680999
- 2025 Slangewal K, Aimon S, Capelle MQ, **Kämpf F**, Naumann H, Baier H, Slanchev K, Bahl A. "Parallel and convergent pathways for multifeature visual processing in larval zebrafish sensorimotor decision-making." *bioRxiv*. doi: 10.1101/2025.08.12.669772
- 2025 Vohra SK, Eberle M, Boulanger-Weill J, Petkova MD, Schuhknecht GFP, Herrera KJ, **Kämpf F**, Ruetten VMS, Lichtman JW, Engert F, Randlett O, Bahl A, Isoe Y, Hege HC, Baum D. "FishExplorer: A multimodal cellular atlas platform for neuronal circuit dissection in larval zebrafish." *bioRxiv*. doi: 10.1101/2025.07.14.664689
- 2025 \*Boulanger-Weill J, \***Kämpf F**, \*Schuhknecht GFP, Schalek RL, Petkova M, Vohra SK, Wu Y, Savaliya JH, Tiller R, Herrera KJ, Naumann H, Eberle M, Rencken S, Stingl M, Hebling A, Hockling D, Slangewal K, Deng Z, Wang RC, Zhang LL, Kirchberger KN, Bianco IH, Baum D, Del Bene F, Engert F, Lichtman JW, Bahl A. "Correlative light and electron microscopy reveals the fine circuit structure underlying evidence accumulation in larval zebrafish." *bioRxiv*. doi: 10.1101/2025.03.14.643363 (\*co-first authors)

## CONFERENCES

- Talk**  
October 2025 **Kämpf, F.** "Contact Chemosensation and Neural Control of Internal States in *Drosophila melanogaster*" Cambrain (Cambridge, UK)
- Poster**  
June 2024 **Kämpf, F.** "Dissection of a neuronal integrator circuit through functionally guided photoactivations and neurotransmitter identifications" Fens Forum, 2024 (Vienna, Austria)
- Poster**  
November 2023 **Kämpf, F.** "Dissection of a neuronal integrator circuit through functionally guided photoactivations and neurotransmitter identifications" Zebrafish Neurobiology Meeting, 2023. Cold Spring Harbour Laboratory (NY, USA)
- Poster**  
November 2023 **Kämpf, F.** "Dissection of a neuronal integrator circuit through correlated light and electron microscopy in the larval zebrafish - Part 3: Functional imaging, anatomy, and neurotransmitters" Society for Neuroscience Meeting, 2023. (Chicago, USA)
- Talk**  
June 2023 **Kämpf, F.** "Connecting cell functionality to cell morphology through light microscopy" Circuits and Behaviour, NeuroTuscany. (Montecastelli, Italy)
- Talk**  
January 2023 **Kämpf, F.**, "Establishing a metric for the quality of diffeomorphic registration of larval zebrafish brains" Bahl Lab retreat (Braz, Austria)